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(11) **EP 0 837 000 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
22.04.1998 Bulletin 1998/17

(51) Int. Cl.⁶: **B65C 9/36, B65C 9/18**

(21) Application number: **97117193.9**

(22) Date of filing: **03.10.1997**

(84) Designated Contracting States:
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**
Designated Extension States:
AL LT LV RO SI

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(30) Priority: **16.10.1996 IT MI962144**

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(54) **Label applying device**

(57) A label applying device comprising a pad (7) of elastic material, with internal suction (9) to retain the labels (5), moveable with linear motion from a label pick up position to a position for contact application of the label on the object to be labelled, the linear movement of said pad being obtained by means of an electric motor (20), controlled by a microprocessor (22), through a system of pulleys (19,21) and a belt (18), an optoelectronic sensor (25) being situated at the corner of the pad to detect the presence of the label and its approach thereto following deformation of the pad when this comes into contact with the object to be labelled.

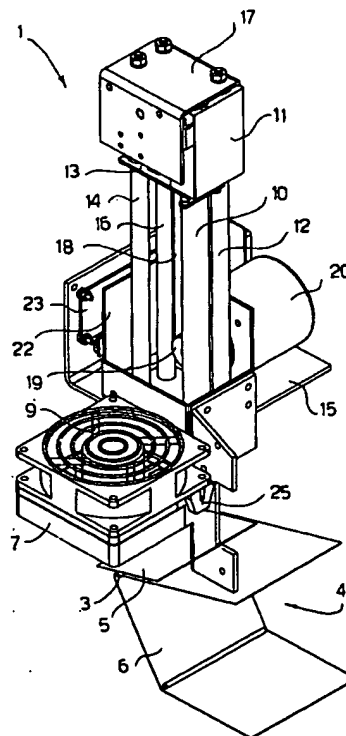


FIG.1

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Description

The present invention relates to a device for applying labels, particularly adhesive labels on objects to be labelled of various types.

In conventional label applying devices, a self-adhesive label is detached from a continuous feed strip, possibly having a silicone paper backing, and fed to an application pad which holds it, for example by means of vacuum, on the non-adhesive side. The object to be labelled is brought into a set position at the applying device and the pad with the label is moved to press the label onto the object.

These known labelling devices normally use pneumatic actuators to confer a linear or oscillating movement on the labelling pad, and are placed frontally to the label feeding machine.

This involves a series of drawbacks.

First of all, the use of pneumatic actuators requires a source of compressed air internal or external to the device, making it difficult to use in environments such as offices, supermarkets, hospitals and the like, where for reasons of noise, cost, cleanliness and practicality it is a desirable characteristic not to have to provide a compressed air supply.

These known labelling devices are also of considerable size, making them difficult to maneuver.

The object of the invention is to eliminate the above mentioned drawbacks of conventional labelling devices.

In particular, a specific object of the invention is to provide a label applying device that is free from the problems related to the use of compressed air.

Another object of the invention is to provide such a device that is compact, reliable, has a limited weight and size, and is easy to maneuver.

These objects are achieved with the device according to the invention which has the characteristics stated in appended independent claim 1.

Advantageous embodiments of the invention are described in the dependent claims.

Basically, the label applying device according to the invention comprises an electric motor controlled by a microprocessor for movement of the label applying pad, contact of which with the object to be labelled is detected by means of a sensor that measures the deformation of the pad or its support.

The pad is provided with a plurality of holes that allow air to pass, in order to allow the vacuum generated by an electric fan, mounted on the side thereof not in contact with the label, to keep the label attached.

The applicator according to the invention is particularly suitable for use in connection with thermal or thermal transfer printers.

Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non-limiting embodiment thereof, illustrated in the appended drawings, in which:

Fig. 1 is an axonometric view showing the basic components of the label applying device according to the invention and the terminal part of a label dispensing assembly;

Fig. 2 is a view of the label applying device, similar to that in Fig. 1, with the applicator pad in the lowered position on the product to be labelled;

Fig. 3 is an axonometric view of the label applicator device according to the invention, in a position rotated 90° anticlockwise with respect to the view in Fig. 1;

Fig. 4 is an axonometric view from below of the label applying device.

With reference to said figures, 1 indicates the label applying device according to the invention as a whole.

The device 1 is situated immediately downstream of a label separating unit 3 of a dispenser 4 for labels 5, only the terminal part of which is shown. The label separating unit 3 separates the labels 5 from a silicone-coated backing strip 6, to transfer them to the applicator device in the manner that will be described below.

Naturally, the labels 5 can be fed to the applicator device without the silicone-coated backing 6, according to techniques that can in any case be considered per se known.

The applicator device 1 comprises a pad 7 provided with a plurality of through holes 8 (see Fig. 4), situated immediately at the exit of the separating unit 3, to receive on its underside a label 5, by the non-adhesive side.

Corresponding with the opposite face of the pad 6 (the upper one with reference to Figs. 1 to 3) a fan 9 is provided, which sucks air through said holes 8, creating a vacuum which allows the label 5 to be kept attached to the pad 7.

The pad 7-fan 9 assembly is mounted at the lower end of a supporting rod 10, integral with an upper carriage 11, that can slide vertically guided along a bar 12.

Fixed to the carriage 11 is a plate 13 that can slide along a second bar 14, to prevent torsional movements of the carriage.

The two bars 12, 14 are fixed between a bottom plate 15 and a top plate 17, a third bar 16, simply for stiffening, being situated between said plates 15, 17.

The carriage 11 is pulled along the bar 12, by means of a belt 18, to which it is fixed, a belt that winds onto a bottom pulley 19, integral with the axle of an electric drive motor 20 and is kept under tension by an idle top pulley 21 (see cross-section in Fig. 2), supported by the top plate 17.

The motor 20 is controlled by a microprocessor drive 22.

An operator interface console 23 allows parameters to be programmed and data to be displayed.

An optoelectronic sensor 25, situated at a corner of the pad 7, detects both the presence of the label 5 and the approach thereof to the sensor, during application on the object to be labelled, because of the deformation of the pad 7 when it comes into contact with the object.

Operation of the label applying device according to the invention is as follows.

The label dispenser 4 supplies the label 5 to the application pad 7 when the latter is in the raised, retracted position shown in Figs.1 and 3. The pad 7 is then lowered, by means of the motor 20 and the belt 16 onto the object to be labelled until the label is brought into contact with the object, with a certain pressure.

The optoelectronic sensor 25 measures the force with which the label is pressed, on the basis of the deformation of the pad 7. Once an adequate force value is reached, the pad 7 is retracted to the initial position.

The sensor 25 allows the stroke and force of impact of the pad 7 to be adapted to the distance of the object and to its characteristics of resistance to pressure, thus allowing labelling of objects situated at different distances or of different sizes, as well as adjustment of the application pressure to the product characteristics.

Once the label 5 has been applied, and the pad has retracted into the position in Figs.1 and 3, it can receive a further label 5 from the dispenser 4, thus recommencing the cycle.

The pad 7 moves along a rectilinear course between the two positions, i.e. label pick up and label application position.

This arrangement makes the structure simple and compact, as well as economical.

The pad 7 is preferably made of foamed elastomer. This material allows easy detection of its deformation, as well as adaptation of its surface to irregular surfaces.

Claims

1. An applicator device for labels, particularly adhesive labels on products to be labelled, comprising an electric motor (20) that drives a pad (7) for application of a label (5) with a linear motion, to move it from a label pick up position to a position of contact with the product to be labelled, and vice versa, means (25) being provided to measure the force of contact of said pad (7) with the object to be labelled.
2. A label applying device according to claim 1, characterized in that said motor (20) is controlled by an electronic system equipped with a microprocessor.
3. A label applying device according to claim 1 or 2, characterized in that said motor (2) drives said pad (7) by means of a belt (16), to which said pad is constrained.
4. A label applying device according to claim 1 or 2, characterized in that said motor (20) drives said

pad (7) by means of a rack integral with the pad.

5. A label applying device according to any one of the preceding claims, characterized in that said pad (7) is integral with a carriage (11) that can slide in a guided manner along at least one bar (12).
6. A label applying device according to any one of the preceding claims, characterized in that an electric fan is combined with said pad (7), integral therewith in the linear movement and exerting a suction effect through a plurality of holes (8) provided in the pad, to keep the label attached to the pad during transfer thereof to the object.
7. A label applying device according to any one of the preceding claims, characterized in that said pad (7) is made of elastic material so that it becomes deformed on contact with the object to be labelled.
8. A label applying device according to claim 1, characterized in that said means for measuring the force of impact of said pad (7) with the object to be labelled comprise an optoelectronic sensor (25) that measures the variation in intensity of the light reflected by the surface of the label, due to nearing thereof to the sensor, because of deformation of the pad following contact with the object to be labelled.
9. A label applying device according to claim 8, in which said sensor (25) also detects the presence of the label (5).
10. A label applying device according to any one of the previous claims, characterized in that it is situated downstream of a label dispenser (4), said labels being fed continuously with or without a silicone-coated backing strip (6).

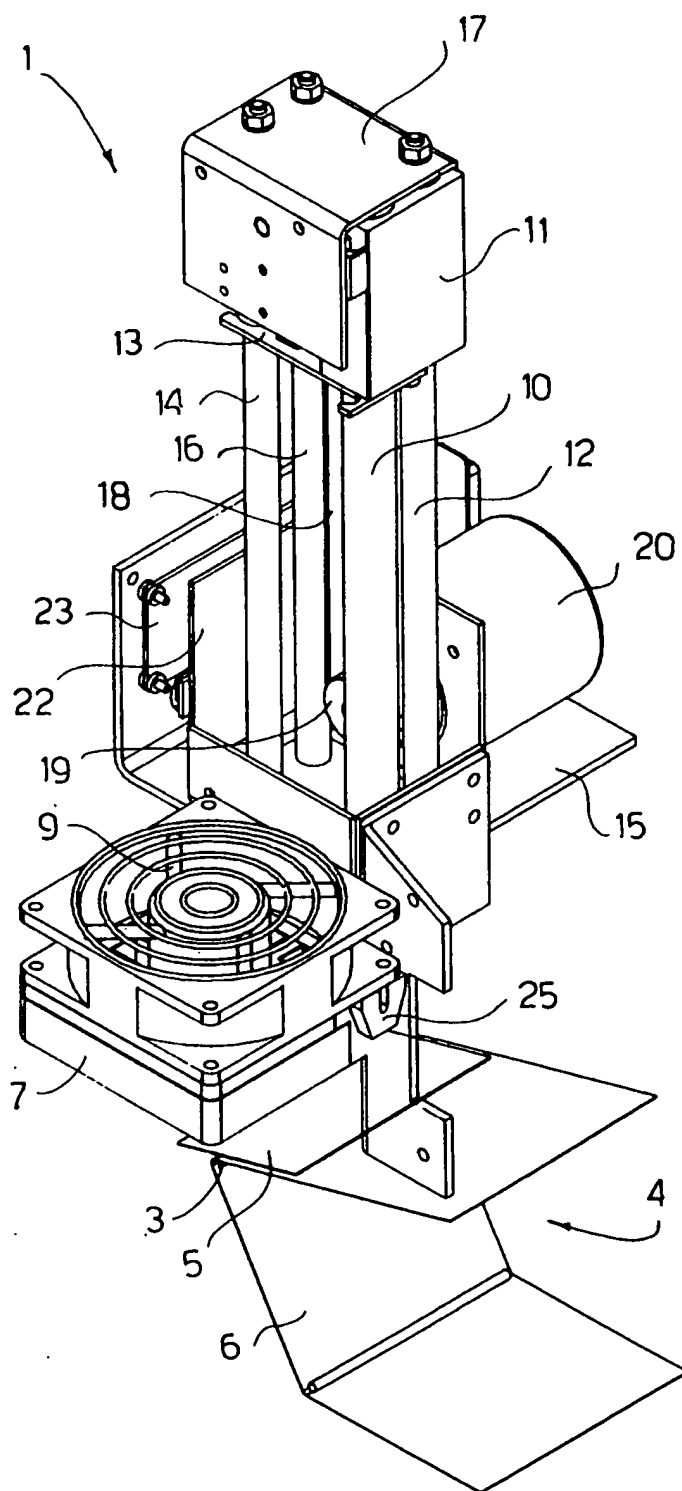


FIG.1

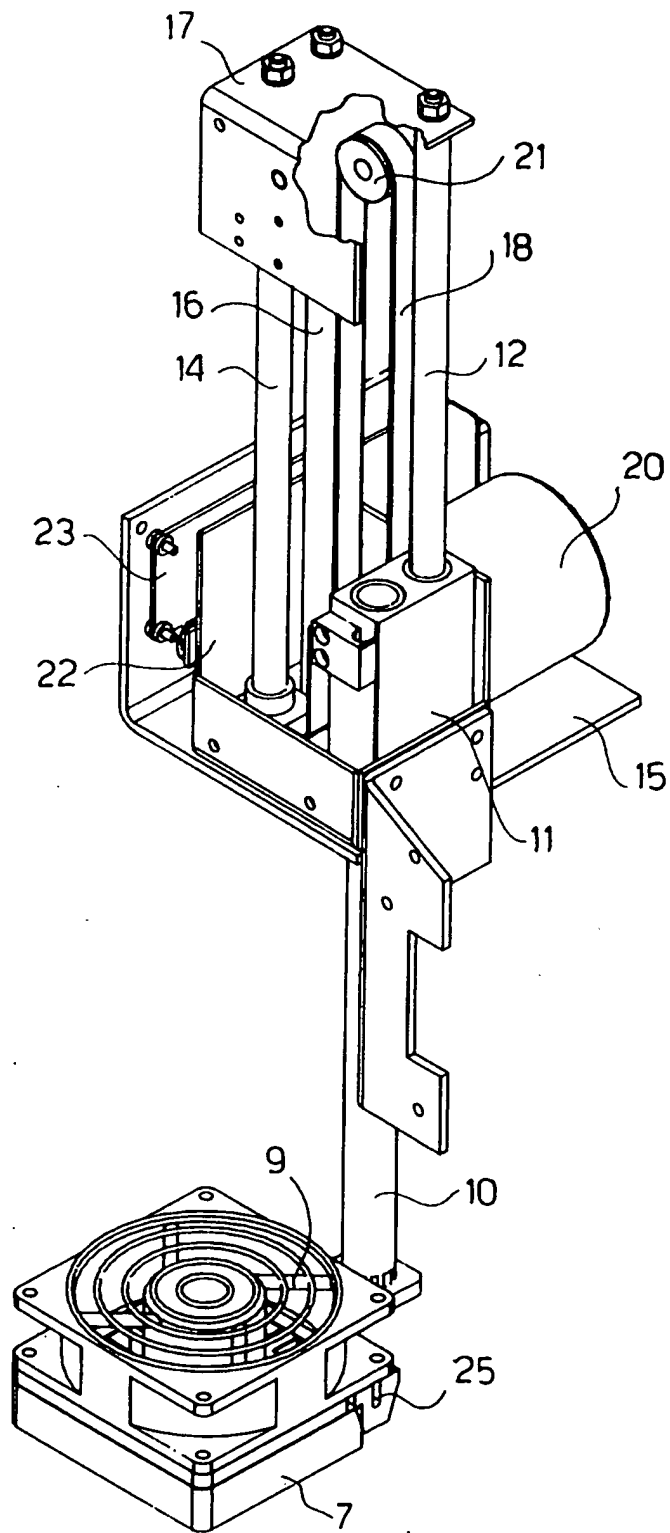


FIG. 2

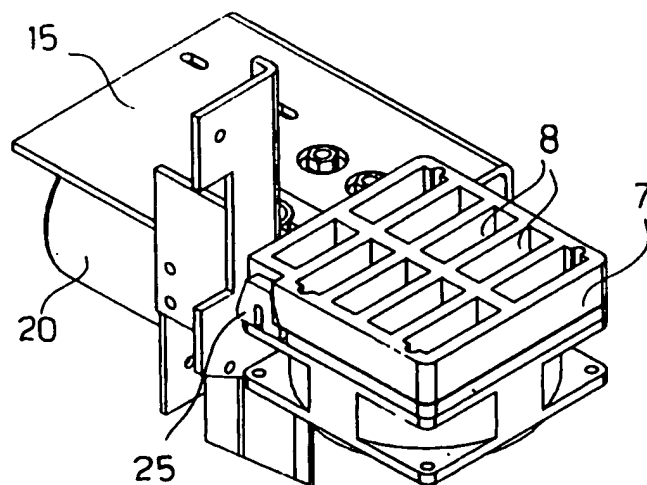
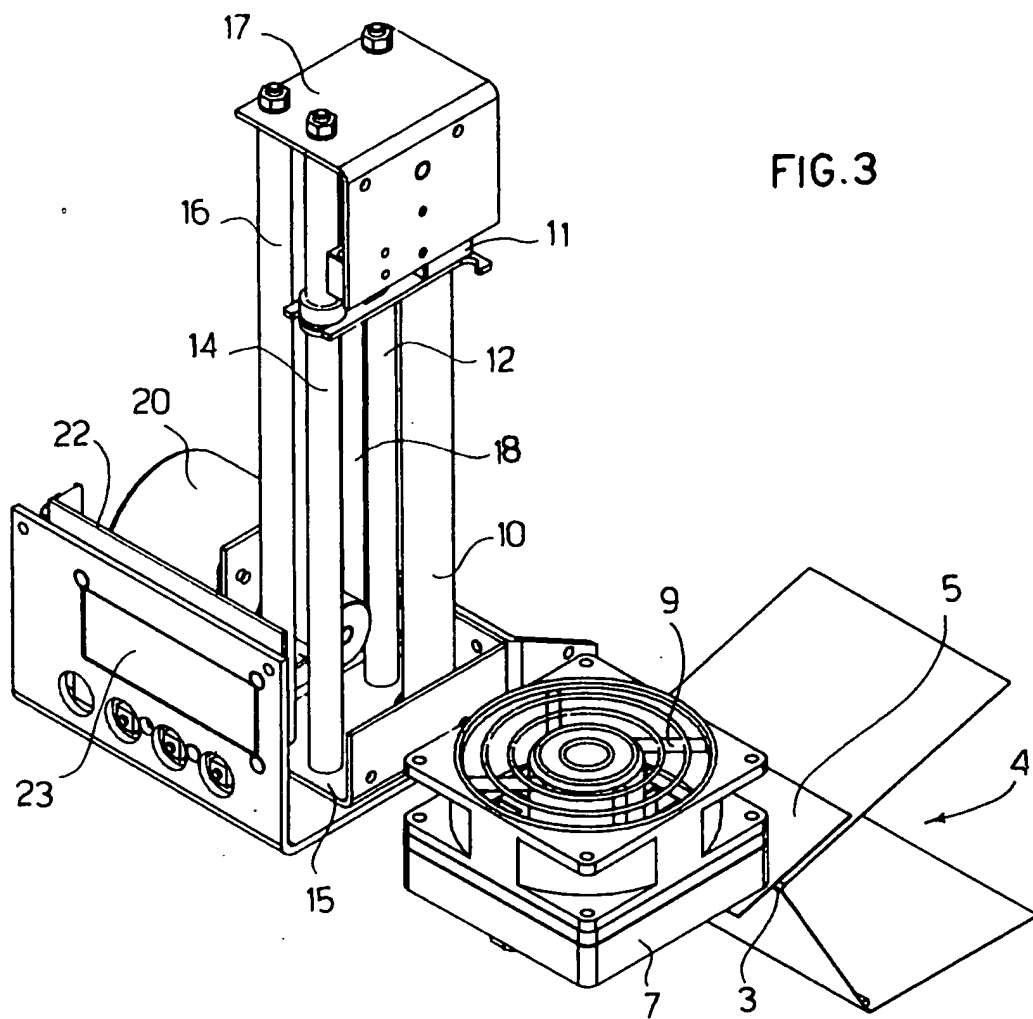


FIG.4



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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 7193

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US 5 435 862 A (P. WILLIAMS ET AL.)	1-3,5,7,10	B65C9/36
A	* column 4, line 47 - column 8, line 14 * * figures 1,2,6-11 *	9	B65C9/18
Y	EP 0 026 753 A (PROPOFLEX ET AL.)	1-3,5,7,10	
	* page 2, line 32 - page 6, line 6 * * figures 1,2 *		
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	* column 4, line 52 - column 7, line 64 * * figures 1,2 *		
A	EP 0 456 999 A (ISHIDA SCALES MFG CO LTD)	1-3,5-7,10	
	* page 13, line 46 - page 14, line 31 * * figure 35 *		
A	DE 27 19 957 A (ETIFIX GEBR. DUDZIK)	1,2,5,7,10	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
	* page 14, line 16 - page 19, line 2 * * figures 1A,1B,4 *		B65C
A	US 4 725 327 A (Y. MATUDA ET AL.)	1,2,5,7,10	
	* column 4, line 60 - column 6, line 19 * * figures 1,2,4,10 *		
A	US 5 300 181 A (Y. YAMAGUCHI)	1,5-7,10	
	* column 3, line 29 - column 6, line 38 * * figures 1,2 *		
A	US 4 612 078 A (E. KARP)	1,5,7,10	
	* column 2, line 51 - column 4, line 56 * * figures 1,2 *		
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 December 1997	Examiner Smolders, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/92 (Pct01)



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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 7193

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 3 616 016 A (H. DINTER) * column 2, line 13 - column 4, line 6 * * figure 3 * -----	1,6,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 December 1997	Examiner Smolders, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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